MECHANICAL PROPERTIES OF BAGASSE FIBERS AFTER CHEMICAL TREATMENT

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ABSTRACT

MECHANICAL PROPERTIES OF BAGASSE FIBER AFTER CHEMICAL TREATMENT

Natural fiber provides an increasing demand on the global needs since these materialsare biodegradable and eco-friendly. Bagasse is a fibrous matter that remains after sugarcane is crushed to extract their juice. The mechanical properties of bagasse fibers, as well as their morphological aspect were studies thoroughly in this research. Bagasse fiber was prepared using retting process and it was then chemically treated with sodium hydroxide (NaOH) of varying concentration (1%, 3%, and 5%). The investigations were conducted on raw and treated bagasse fiber. The fiber length, diameter, tensile strength, and morphological surface were studied. Comparison between raw fiber and treated fiber shows that chemical treatment induced changes in fiber properties. Result from the tests found that the 3% treated fiber shows the highest force at 3.50 N/mm^2. The highest elongation was 2.15 mm and stress was 0.56 N/mm^2 for 3% treated fiber compare to raw fiber. The highest value for Young's Modulus also at 3% treated fiber. FESEM observation on the structure surface of fiber shown that the surface was clean and smooth in case of the 3% treated bagasse fiber in comparison to raw bagasse fiber which here a rough surface. It is shown that the mechanical properties of bagasse fibers were improve after chemical treatment. The result was supported by surface studies.

CHAPTER 1

INTRODUCTION

1.0 Background of the Study

Sugar cane a member of the grass family is a perennial agriculture crop grown primarily for the juices extracted from its stalks. Raw sugar produced from these juice are later refined into white sugar. As a perennial crop, one planting of sugar cane will generally allow for three to six or more annual harvests before replanting is necessary.

In tropical regions of the world sugar cane represents a major crop. Because of the increasing demand for sugar in the last century, large areas in the tropical and subtropical countries all around the world were allotted for sugar cane crop. Low level of maintenance and good productivity made sugar cane an attractive crop for farmers in these regions.

Sugar cane is crushed in a series of mills, each consisting of at least three heavy rollers. Due to the crushing the cane stalk will break in small pieces, and subsequent milling will squeeze the juice out. The juice is collected and process for production sugar. According to Elsunni *et. al.,* (1996), the resulting crushed and squeezed sugar cane stalk was name bagasse. Bagasse is considered to be a by product of the milling process. Addition, bagasse is essentially a waste product that causes mills to incur additional disposal costs.